Contribution ID: **52** Type: **oral**

Status of the FISIC experimental program

Tuesday, 20 September 2016 11:30 (20 minutes)

Knowledge of fundamental electronic mechanisms at play in Fast Ion – Slow Ion Collisions (FISIC) can provide a real breakthrough in the understanding of energy transfer in various plasmas such as inertial confinement fusion plasmas, stellar/interstellar plasmas and also in material damages. Indeed, when a few MeV/u ions collide with a few keV/u ions, a hitherto unexplored collision regime is reached: a regime where the ion energy transfer is at its maximum. There, all the primary electronic processes, like electron capture, loss and excitation, reach their optimum leading, for instance, to possible interference effects. Measurements and reliable theoretical predictions are completely lacking in this intermediate collision regime corresponding therefore to a real "terra incognita" for atomic physics.
Crossing two multicharged ion beams, under well controlled conditions, has always been a very challenging task, whatever the domain of physics under consideration. The forthcoming availability of MeV energy, intense and stable ion beams of high optical quality at French and German Large Scale Facilities (GANIL/SPIRAL2 and FAIR/CRYRING) opens new opportunities towards the intermediate collision regime. With the FISIC project, we propose an experimental crossed-beam arrangement with an ultimate control of experimental conditions to measure absolute electronic cross sections. The goal is to span from a pure three-body problem (collision between a bare ion and a hydrogenic target) to a collision system between dressed partners (study of the effect of a controlled number of additional electrons). For the realization of such a challenging experimental project, a lot of technical barriers have to be overcome, among them, the control and detection of the slow ion charge states, the detection of high energy ions, the overlap between the two ion beams, the design of the collider, the vacuum conditions, the stripping issue of intense ion beams delivered by the SPIRAL2 accelerator,... A status report on the progress of the FISIC program will be presented at the conference.

Collaboration

FISIC

Primary author: LAMOUR, Emily (Institut des NanoSciences de Paris - UPMC)

Presenter: LAMOUR, Emily (Institut des NanoSciences de Paris - UPMC)

Session Classification: International Landscape